

Claims

**What is claimed is:**

1. An apparatus for forming an image using an electrophoretic particle suspension containing media comprising:

a transitioner for sufficiently lowering a viscosity of the suspension to facilitate mobility of at least some of the electrophoretic particles; and,

imaging electrodes for selectively providing an imaging electric field associated with the image to be formed and positioned with respect to said transitioner such that said imaging electric field impinges upon said lowered viscosity suspension;

wherein, said imaging electric field is sufficient to cause select ones of the electrophoretic particles in said lowered viscosity suspension to migrate depending upon said image to be formed.

2. The apparatus of Claim 1, wherein said transitioner comprises at least one heating element.

3. The apparatus of Claim 2, wherein said at least one heating element comprises at least one resistive heating element.
4. The apparatus of Claim 1, wherein said transitioner comprises a plurality of heating elements.
5. The apparatus of Claim 1, wherein said transitioner comprises at least one heating plate coupled to a platen.
6. The apparatus of Claim 1, further comprising mixing electrodes suitable for providing a mixing electric field suitable for causing the electrophoretic particles in said viscosity lowered suspension to more homogeneously distribute in the suspension before being impinged upon by said imaging electric field.
7. The apparatus of Claim 6, wherein media having said homogenous distribution appears gray.

8. The apparatus of Claim 6, wherein said mixing electrodes comprise conductive strips.

9. The apparatus of Claim 8, wherein said mixing electrodes further comprise a common conductor.

10. The apparatus of Claim 9, wherein said common conductor is substantially potentially grounded.

11. The apparatus of Claim 8, wherein at least one of said strips has a different potential than another of said strips.

12. The apparatus of Claim 6, wherein said mixing electric field fluctuates.

13. The apparatus of Claim 6, wherein said mixing electric field is between about 0.25 V/um to about 4.0 V/um.

14. The apparatus of Claim 1, wherein said imaging electrodes comprise an array of fixed electrodes.

15. The apparatus of Claim 14, wherein said imaging electrodes further comprise a fixed conductor.

16. The apparatus of Claim 15, wherein said fixed conductor is substantially potentially grounded.

17. The apparatus of Claim 14, wherein each of said fixed electrodes are substantially individually excitable.

18. The apparatus of Claim 17, wherein excitement of at least one of said fixed electrodes causes a color change in a corresponding portion of the media.

19. The apparatus of Claim 1, wherein at least one of said writing electrodes is movable.

20. The apparatus of Claim 1, further comprising a re-transitioner for facilitating increasing of the viscosity of the suspension to impede mobility of at least some of the electrophoretic particles subsequent to electrophoretic particle migration.

21. The apparatus of Claim 1, further comprising at least one roller for moving said media between said transitioner and imaging electrodes.

22. The apparatus of Claim 1, further comprising at least one sensing mechanism for facilitating aligning the media and writing electrodes.

23. A method for forming an image using an electrophoretic particle suspension containing media comprising:

lowering a viscosity of the suspension to facilitate mobility of at least some of the electrophoretic particles; and,

selectively providing an imaging electric field associated with the image to be formed to act upon the lowered viscosity suspension;

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- wherein, said imaging electric field is sufficient to cause select ones of the electrophoretic particles in said lowered viscosity suspension to migrate depending upon said image to be formed.

24. A media suitable for retaining a formed image, said media comprising a plurality of substrates defining an interior hollow including an electrophoretic particle containing, phase-transitionable suspension suitable for enabling migration of said electrophoretic particles responsively to an applied electric field in a first state and substantially impeding migration of said particles in a second state.

25. The media of Claim 24, wherein said suspension is in said second state at room temperature.

26. The media of Claim 24, wherein said suspension is substantially opaque in said second state.

27. The media of Claim 24, wherein said suspension is substantially semi-translucent in said second state.
28. The media of Claim 24, wherein said suspension comprises at least one isoparaffin material.
29. The media of Claim 24, wherein said suspension consists essentially of paraffin wax, at least one alcohol and toner particles.
30. The media of Claim 29, wherein said toner particles have a diameter between about 3 microns and about 10 microns.
31. The media of Claim 24, wherein said suspension is thermally sensitive.
32. The media of Claim 24, further comprising a plurality of chamber walls substantially between said first and second substrates at least partially forming a plurality chambers containing said suspension.

33. The media of Claim 24, wherein at least one of said substrates at least partially forms a plurality chambers containing said suspension.

34. The media of Claim 24, wherein said first and second substrates are at least partially adhered to one another.

35. The media of Claim 24, wherein at least one of said substrates comprises at least one film.

36. The media of Claim 34, wherein said film comprises at least one plastic.

37. The media of Claim 24, wherein said suspension consists essentially of paraffin wax, at least one amine and toner particles.

38. The media of Claim 24, wherein a first subset of said particles has a first color and a second subset of said particles has a second color.



39. The media of Claim 38, wherein said first color is white and said second color is black.

40. The media of Claim 38, wherein a third subset of said particles has a third color.

41. The media of Claim 40, wherein said first, second and third colors are either red, blue and green or magenta, yellow and cyan.

42. A method for forming a media for retaining a formed image, said method comprising:

providing a first substrate;

depositing an electrophoretic particle containing, phase-transitional suspension suitable for enabling migration of said electrophoretic particles responsively to an applied electric field in a first state and substantially impeding migration of said particles in a second state onto said first substrate; and,

sealing a second substrate to said first substrate.

43. The method of Claim 42, further comprising heating said suspension prior to deposition.